L 19656-63
ACCESSION NR: AR3006998

Zn and 30 min. at 200°C for Sn-Pb), simultaneous presence of fine-crystal (>1μ) and coarse-crystal (>10μ) structures was observed. The maximum grain dimension was attained after deformation by 10--20% with annealing at 200°C, 10% at 300°, and 8% at 410°C. V. Verner

DATE ACQ: 06Sep63 SUB CODE: PH ENCL: 00

Card 2/2

SAMSEL', N. V.

Mbr., Inst. Rubber & Gutta-Percha Plants, -1943-. Mbr., Moscow Zootechnical Inst. -1943-. "Gutta-Percha in the Bark of Roots and Trunks of Spindle Trees, Euonymus Verrucosa Scop. and Euonymus Velutina F. et M.," Biokhim., 8, No. 1, 1943.

SAMSEL', N.V.

New bryophyta species from the genus Fissidens Hedw. in Kara-Tau.
Biul.MOIP Otd.biol.58 no.6:77-79 '53. (MLRA 7:1)
(Kara-Tau--Mosses) (Mosses--Kara-Tau)

SAMSEL', N. V.

"Vegetation of the Meshcher Lake Region." Cand Biol Sci, Moscow Order of Lenin State U imeni M. V. Lomonosov, Moscow, 1955. (KL, No 8, Feb 55)

SO: Sum. No. 631, 26 Aug 55-Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (14).

SAMSEL', N.V.

Dependence of the keeping quality of some varieties of apples on the anatomical structure of their skin. Vest. Mosk.un.Ser.6: Biol., pochv. 19 no.1:50-60 Ja-F '64. (MIRA 17:4)

1. Kafedra vysshikh rasteniy Moskovskogo universiteta.

SAMSINAK, Karel, dr.

Contribution to the knowledge of the genus Tyrophagus Oudemans.
Cas entom 59 no.3:266-280 '62.

1. Biologisches Institut der Tschechoslowakischen Akademie der Wissenschaften, Abteilung fur Entomopathologie, Praha 6, Na cvicisti 2.

SAMSINAK, Karel, dr.

New entomophilous mites from China. Cas entom 59 no.2:186-204 '62.

1. Biologisches Institut der Tschechoslowakischen Akademie der Wissenschaften, Abteilung fur Entomopathologie, Praha 6, Na cvicisti 2.

SAMSINAK, Karel, dr.

Chelacheles michalskii n.sp. (Acari, Cheyletidae); the second contribution to the knowledge of mites important in forestry. Cas entom 59 no.2:183-185 '62.

1. Biologisches Institut der Tschechoslowakischen Akademie der Wissenschaften, Abteilung fur Entomopathologie, Praha 6, Na cvicisti 2.

SAMSINAK, Karel, dr. (Na Cvicisti 2, Praha-Dejvice)

Contribution to the knowledge of family Anoetidae (Acari).
Cas entom 59 no.1:87-97 '62

1. Biologisches Institut der Tschechoslowakischen Akademie der Wissenschaften, Abteilung fur Entomopathologie.

SAMSINAK, Karel

Brief notes on Mesostigmata (Acari). Cas entom 57 no.3:275-284 '60.
(EEAI 10:1)

1. Biologisches Institut der Tschechoslovakischen Akademie der Wissenschaften, Abteilung fur Entomopathologie.
(Mites) (Mesostigmata)

SAMSINAK, Karel, Dr. (Na cvicisti 2, Praha 6)

The termites from China. Cas entom 58 no.2:193-207 '61.
(EEAI 10:9)

1. Biologicky ustav Ceskoslovenske akademie ved, Praha.

(Termites)

SAMSINAK, Karel

Some myrmecophilous mites from the family Acaridae. Cas entom 57 no.2:185-192 '60. (EEAI 10:1)

1. Biologisches Institut CSAV, Abteilung fur Entomopathologie.
(Mites) (Garsaultia) (Myrmoglyphus)
(Tyroglyphidae) (Acotyledon)

COUNTRY : CZECHOSLOVAKIA K
CATEGORY : Forestry. Dendrology.

ABS. JOUR. : RZhBiol., No. 3 1959, No. 10770

AUTHOR : Samsinak, K.
INST. : -
TITLE : The Age of Semtinsk Linden Trees.

ORIG. PUB. : Ochrana prirody, 1957, 12, No. 10, 292-292.

ABSTRACT : According to the popular legend, the planting and history of Semtinsk linden are associated with the name Zhizhka, as are the planting and history of the oldest trees of the Czech Republic. The author has established that these linden trees were planted considerably later since their age was determined to be 230-240 years. Linden aged 300-400 years have survived near the Volch'ye Pole settlement. — S. M. Stoyko

CARD: 1/1

Mesostigmata s gryzuli...

Orig Pub: Ceskosl. epidemiol., mikrobiol., imunol., 1957, 6, No 2, 107-112.

Abstract: No abstract.

Card 1/1

Abs Jour : Ref Zhur - Biologiya, No 16, 1958, No. 73689

Author : Samsinak, K.
Inst : Not given
Title : Tyroglyfoid Mites - A Pest of Food Stores

Orig Pub : Zool. listy, 1957, 6, No 3, 283-290

Abstract : The number of species of flour mites found in food stores in Czechoslovakia is given. It is mentioned that, with increased purchases [of flour] in East European countries, new species of mites - Tyrophagus noxius and T. tenuclavus - have been found. The first is also found on bacterial cultures in laboratories.

Card 1/1

SAMSINAK. K.

"A few faunistic notes on the acari living in close relationship with insects; Acari. In German."

p. 109 (Sbornik Faunistickych Praci. Acta Faunistica Entomologica, No. 2, 1957, Praha Czechoslovakia.)

Monthly Index of East European Accessions (EEAI) LC, Vol. 7, No.6 June 1958.

SAMSINAK, K

PRIVORA, M.; SAMSINAK, K.

Mites as a plague of the mankind. J. Hyg. Epidem., Praha 1 no.4:423-430 1957.

1. Institut fur Epidemiologie und Mikrobiologie, Prag. Biologisches Institut der Akademie der Wissenschaften, Prag.
(MITES,
distribution & control in Czech. (Ger))

SAMSINAK, K.

CZECHOSLOVAKIA / General and Specialized Zoology. Insects. P

Abs Jour: Ref Zhur-Biol., No 2, 1958, 6668.

Author : Samsinak, Karel.
Inst : Not given.
Title : Sifolinia Emery - A Genus of Ants New To Central Europe.

Orig Pub: Ochrana prirody, 1956, 11, No 5, 144-146.

Abstract: Based on a single specimen of a wingless female, the new species of the S. pechi ant is described and its differences from the S. laurae Emery are given. The species was found in the region of Labske Steny in North-West Czechoslovakia. -- M. N. Nikol'skaya.

Card 1/1

PRIVORA, M.; SAMSINAK, K.

Studies on ectoporasites in rodents in Czechoslovakia.
Cesk. epidem. mikrob. imun. 5 no.1:34-36 Mar 56.

1. Z Ustavu epidemiologie a mikrobiologie a z Biologickeho ustavu CSAV, laboratore pathologie hmyzu v Praze.
(PARASITES,
ectoparasites in rats in Czech. (Cz))
(RATS,
ectoparasites in Czech. (Cz))

SAMSINIAK, KAREL

DANIEL, Milan; SAMSINIAK, Karel.

Phanolophus nasica Andre (Acari: Smarididae) a new parasite of the Italian locust [Calliptamus italicus (L.)]. Zool.zhur. 34 no.6:1242-1249 N-D '55. (MLRA 9:1)

1. Parazitologicheskiy institut biologicheskogo fakul'teta i Biologicheskiy institut ChSAN,Praga.

(Parasites--Locusts) (Mites)

SAMSINAK, K.

"The terrestrial Acari of the British Isles" by G.O.Evans, J.G. Sheals, D.MacFarlane. Vol.1. Reviewed by K. Samsinak. Cas entom 61 no.1:82-83 '64.

"Acarology; series on comparative study of mites; stage systems in parasite development" by W. Hirschmann, I. Zirngiebel-Nicol. Reviewed by K. Samsinak. Ibid.:83

"Contribution to the systems and ecology of mid-European Acarina" by H.J. Stammer. Reviewed by K. Samsinak. Ibid.:83

SAMSINAK, Karel, CSc.

Information on the ant fauna (Hym.) in Czechoslovakia. Cas entom 61 no.2:156-158 '64

1. Institute of Entomology, Czechoslovak Academy of Sciences, Prague 6, Na cvicisti 2.

L 5268-66 FBD/EWT(1)/FCS(k) GW/WS-2/WR

ACCESSION NR: AP5022800 UR/0141/65/008/004/0768/0770
621.396.677.497:523.164

AUTHOR: Grigor'yev, G. I.; Kovner, M. S.; Nikiforova, O. G.; Obolenskiy, L. M.; Samsonov, A. V.; Trakhtengerts, V. Yu.

TITLE: Logarithmic-periodic helical exciter for a paraboloid with 1:7 frequency coverage

SOURCE: IVUZ. Radiofizika, v. 8, no. 4, 1965, 768-770

TOPIC TAGS: antenna directivity, conic antenna, antenna polarization, radio telescope antenna

ABSTRACT: The authors present the results of tests on a model of a broadband exciter for the 15-meter paraboloid of the Zimenki radio telescope. The model scale was 1:10. The reflector used was a parabolic cylinder with focal distance 0.525 m, height 1 m, and aperture D = 1.5 m. The exciter was a conical bifilar-wound cable helix with vertex angle 90° and pitch angle 7°. The vertex of the cone was at the focus of the paraboloid. The directional pattern and the standing wave ratio of the system were measured in the range $1.5 \leq D/\lambda \leq 10$, where λ is the working wavelength. The results are shown in Fig. 1 of the Enclosure. The fact that a directivity angle of 10° can be obtained with D/λ close to 2 is taken as an indi-

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ACCESSION NR: AP5022800

6

cation that such a system can ensure high directivity with small antenna dimensions. It is emphasized, however, that no final conclusions can be drawn until phase-distribution measurements are made. The results for horizontally polarized radiation differ little from those for vertical polarization, except that side lobes appear at some frequencies. "The authors thank Yu. M. Zhidko for a discussion of the results." Orig. art.has: 2 figures. [02]

44 55

ASSOCIATION: Gor'kovskiy gosudarstvennyy universitet (Gor'kiy State University) 44 55

SUBMITTED: 08Jul64 ENCL: 01 SUB CODE: AA, EC

NO REF SOV: 001 OTHER: 004 ATD PRESS: 4137

Card 2/2

SAMSON, A.M.

USSR/ Physical Chemistry - Molecule. Chemical bond B-4

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 10846

Author : Stepanov B.I., Samson A.M.
Inst : Academy of Sciences Belorussian SSR
Title : Dependence of Probability of Optical Transitions on Transition Frequency and Oscillation Energy Supply of Complex Molecule

Orig Pub : Vestsi AN BSSR, Ser. fiz. -tekhn. n., Izv. AN BSSR, Ser. fiz. -tekhn. n., 1956, No1, 5-14 (Belorussian; Russian summary)

Abstract : On the basis of the model of unidimensional, classical harmonic oscillator for a complex molecule of group 1, an expression has been derived for the probability of transitions from different oscillation levels of lower electronic state to different oscillation levels of upper electronic state. In the derivation there is taken into account the change in coordinate and impulse in the process of electronic oscillation transition. Investigation of the derived formula in the case of invariable impulse is effected by numerical integration. It is shown that probability of the transitions depend on transition frequency and also on oscillation energy supply of the initial level. Elucidated are the reasons of slight dependence of absorp-

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USSR/ Physical Chemistry - Molecule. Chemical bond B-4

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 10846

tion band contour on temperature. Probability formulas for optical transitions derived in the case of absorption also hold in the case of luminescence.

Card 2/2

SAMSON, A.M.

Angular distribution of resonance radiation from plane parallel layers. Inzh.-fiz.zhur. no.1:65-73 Ja '58. (MIRA 11:7)

1.Institut fiziki i matematiki AN BSSR, g.Minsk.
(Radiation)

GURINOVICH, G.P.; SAMSON, A.M.

The first republican scientific-technical conference on the application of methods of molecular spectrum analysis. Inzh.-fiz.zhur. no.7:120-121 Jl '58. (MIRA 11:8)
(Spectrum analysis)

AUTHOR: Samson, A.M. SOV/51-5-5-3/23

TITLE: Resonance Emission by Finite Volumes (Rezonansnoye svecheniye konechnykh ob"yemov)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 5, pp 500-510 (USSR)

ABSTRACT: Secondary processes occurring in any finite volume affect the intensity, yield, line-shape, decay velocity and other spectroscopic characteristics of the emitted light. Such effects complicate the dependences of the properties of emitted light on the experimental conditions and make it difficult to interpret the results obtained. Under laboratory conditions the effects of secondary processes may be minimized by using small objects or low concentrations. This is not always possible since with decrease of the amount of the substance studied the intensity of emission decreases. In some cases, e.g. in astrophysics, reduction of emitting object volume is completely out of the question. The present paper discusses resonance emission by volumes of any shape and size. An integro-differential equation is obtained which takes into account the degenerate emission, the effect of thermal background and non-optical excitation. Solution of this equation by the method of successive approximations makes it possible

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to determine the magnitude of secondary effects and to find the limits of applicability of formulae which neglect the secondary effects. The author discusses the special case of a plane-parallel layer under steady-state conditions. In the majority of cases it is necessary to include the effects of secondary, tertiary and higher processes when discussing resonance emission. It is possible that the observed departures of experiment from theory, e.g. in decrease of the quantum yield with increase of concentration, may be due to neglect of secondary and higher emission processes. The author thanks B.I. Stepanov for suggesting the work and for advice on it. There are 6 figures and 20 references, 11 of which are Soviet, 4 German, 2 American, 2 translations and 1 other.

SUBMITTED: December 31, 1957

Card 2/2 1. Light 2. Secondary emission--Mathematical analysis

24(7)

AUTHOR: Samson, A. M. SOV/48-22-11-28/33

TITLE: Resonance Luminescence of Matter in a Finite Volume (Rezonansnoye svecheniye veshchestva v konechnykh ob"yemakh)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1958, Vol 22, Nr 11, pp 1399-1402 (USSR)

ABSTRACT: In this paper the author derived a general integro-differential equation for randomly shaped volumes. It permits to take into account the influence of forced emission, of the thermal background, and of the presence of nonoptical excitation. In special cases it also provides a means of estimating the influence of secondary absorption- and emission processes upon the spectroscopic characteristics of resonance luminescence. If the non-optical and the thermal excitation are small as compared to external excitation, and if the forced emission can be neglected, the solution of this equation may take the form:

$$\gamma(\rho_0,\theta) = \gamma\int_{-\infty}^{\theta} e^{-(\theta-\theta')} w(\theta')\,d\theta' \sum_{i=0}^{\infty} \frac{\gamma^i(\theta-\theta')^i}{i!}\Phi_i(\rho_0) \qquad (2)$$

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with $$\eta = \frac{n_2}{n} \; ; \; \gamma = \frac{A}{A + d_{21}} \; ; \; \theta = (A + d_{21})t. \qquad (3)$$

Formula (2) specifies the number of excited particles at the point ϱ_o for the moment θ. Several special cases (induction, extinction, steady conditions) are specified by the corresponding form $w(\theta)$. For steady state conditions in particular there follows from (2):

$$\eta(\varrho_o) = \gamma w_o \left[\Phi_o + \gamma\Phi_1 + \gamma^2\Phi_2 + \gamma^3\Phi_3 + \cdots\right] = \gamma w_o \sum_{i=0}^{\infty} \gamma^i \Phi_i \qquad (5)$$

Every term of the series (5) can be invested with a special physical meaning. According to (2) the distribution of the excited particles and hence also the intensity of emission is in a complicated way dependent upon time. An analysis of formula (2) shows that the law of extinction does not only depend on the amount of matter in the volume and the quantum yield, but also on the excitation- and observational conditions. Figure 3 shows several extinction curves (straights). Although this figure 3 offers no information permitting to pass a judgement on the violation of the exponential course of extinction, an analysis of formula (2) demonstrates that

extinction does not take an exponential course, the deviation increasing with time. The author expressed his gratitude to B. I. Stepanov for suggesting the subject. There are 3 figures and 5 references, which are Soviet.

ASSOCIATION: Institut fiziki i matematiki Akademii nauk BSSR (Institute of Physics and Mathematics, Academy of Sciences, Belorussian SSR)

SAMSON, A.M.

Resonance radiation in finite spaces. Vestsi AN BSSR. Ser. fiz.-tekh. nav. no.3:16-29 '59. (MIRA 13:3)
(Resonance) (Radiation)

SAMSON, A.M.

Distribution of radiation in a plane parallel layer in the case of an arbitrary scattering index. Dokl. AN BSSR 3 no.5: 197-201 My '59. (MIRA 12:10)

1. Predstavleno akademikom AN BSSR B.I. Stepanovym.
(Light)

SOV/170-59-6-9/20

24(4)

AUTHOR: Samson, A.M.

TITLE: Non-Stationary Luminescence of Volumes of Finite Dimensions

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1959, Nr 6, pp 61-71 (USSR)

ABSTRACT: The propagation of radiation in a substance is accompanied by the secondary processes of absorption and emission. These secondary processes have an especially strong effect on the nature of luminescence in experiments with resonance radiation. The intensification or damping of luminescence proceeds for a longer period of time than in an elementary volume. This phenomenon of luminescence lengthening has been poorly studied theoretically, although there are some papers dealing with the subject, such as those of Biberman [Ref 6], Agranovich [Ref 7], Gamburzeff [Ref 8], Ivanov [Ref 9] and Sobolev [Ref 10]. In the present article, the effect of secondary processes on the character of resonance luminescence under non-stationary conditions is investigated on the basis of solving integro-differential equation which is used for determining the number of excited and unexcited particles. Several particular

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Non-Stationary Luminescence of Volumes of Finite Dimensions

cases are analyzed: 1. The pulse excitation of the system, 2. The damping of radiation after an infinitely long preliminary irradiation, and 3. The intensification of luminescence. The analysis of these particular cases shows that the number of excited particles varies according to the usual exponential law only when secondary processes of absorption and emission can be neglected. This is justified either for small volumes or the low values of the quantum yield. In all other cases the change in the number of excited particles proceeds considerably more slowly, the average duration being longer sometimes by a factor of 5 to 10 times. The non-stationary radiation emitted from a plane parallel layer with substance had also been studied. The values of radiation intensity for any instant and at various angles of incidence and observation, quantum yield and layer thickness, and formulae for average times of reflected and transmitted radiation have been obtained, Formulae 35 and 36. However, to use them, one has to know analytical expressions for I_R (intensity of reflected radiation) and I_T (intensity of transmitted radiation). Ambartsumyan [Ref 10] has shown that they are determined, by Formulae 37 and 38, under stationary conditions, through auxiliary functions $\varphi(\eta)$ and $\psi(\eta)$ which

Non-Stationary Luminescence of Volumes of Finite Dimensions

are solutions of a system of non-linear differential equations. Rigorous analytical expressions for φ and ψ are not available in literature, but their approximate expressions are given in a previous paper of the author [Ref 12]. In conclusion, the author thanks B.I. Stepanov, Member of the AS Belorussian SSR, for the subject of investigation suggested and attention to this study. There are: 1 set of graphs and 12 references, 9 of which are Soviet, 2 German and 1 American.

ASSOCIATION: Institut fiziki i matematiki AN BSSR (Institute of Physics and Mathematics of the AS Belorussian SSR), Minsk.

Non-Stationary Luminescence of an Infinitely Thick Layer

Formulae 16,17. It follows from the analysis of these formulae that the intensity of luminescence emitted from a layer of infinite thickness depends not only on the quantum yield of elementary volume, but also on the conditions of irradiation and observation. Moreover, the de-excitation of luminescence proceeds according to exponential law $e^{-\tau}$ only at low values of the quantum yield γ ; in all other cases the intensity decreased considerably; they are expressed by Formulae 26 and 27, or approximate Formulae 28 and 29, for the pulse and long excitation respectively. This phenomenon is accounted for by the secondary processes of absorption and emission. Therefore the formula derived by Ivanov [Ref 7] for the non-stationary luminescence of a scattering layer, Formula 19 in the text, is not sufficient for a description of the actual processes of luminescence, as it takes into account the terms of the first and second order only, i.e. emission of the first and second order. In conclusion the author thanks B.I. Stepanov, Member of the AS Belorussian SSR, for the suggested subject

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R001447010016-7"

of investigation and attention to this study.
There are: 2 graphs, 2 tables and 8 Soviet references, one of which is a translation from English.

ASSOCIATION: Institut fiziki i matematiki AN BSSR (Institute of Physics and Mathematics of the AS Belorussian SSR), Minsk.

SAMSON, A.M.

Luminescence of matter with arbitrary absorption and emission bands in finite volumes. Dokl.AN BSSR 3 no.12:479-483 D '59. (MIRA 13:4)

1. Predstavleno akademikom AN BSSR B.I.Stepanovym.
(Radiation)

SAMSON, A. M., Cand Phys-Math Sci -- (diss) "Influence of secondary absorption and emission processes on the nature of the luminescence of matter in volumes of finite dimensions." Minsk, 1960. 12 pp; (Ministry of Higher and Secondary Specialist Education USSR, Belorusskiy State Univ im V. I. Lenin); 200 copies; price not given; list of authors' works at end of text (11 entries); (KL, 25-60, 126)

SAMSON, A.M.

Luminescence of matter in arbitrary absorption and emission bands in an infinitely thick layer. Dokl.AN BSSR 4 no.2:51-54 F '60. (MIRA 13:6)

1. Predstavleno akademikom AN BSSR B.I. Stepanovym.
(Luminescence)

68315

24,3500

SOV/51-8-1-15/40

AUTHOR: Samson, A.M.

TITLE: The Effect of Secondary Absorption and Emission Processes on the Duration of Radiation Emitted by a Plane-Parallel Layer

PERIODICAL: Optika i spektroskopiya, 1960, Vol 8, Nr 1, pp 89-97 (USSR)

ABSTRACT: The author deals with the effect of secondary absorption and emission processes on the duration of luminescence or resonance radiation of a plane-parallel layer. Formulae obtained can be used to calculate the required duration under various conditions of irradiation and observation. When the quantum yield is high the duration may be considerable. The duration observed "by transmission" is always higher than the duration observed "by reflection". The paper is entirely theoretical. Acknowledgment is made to B.I. Stepanov for suggesting the subject and advice on it. There are 2 figures, 3 tables and 24 references, 16 of which are Soviet, 3 English, 2 German and 3 translations from English into Russian.

SUBMITTED: May 14, 1959

Card 1/1

S/048/60/024/05/01/009
B006/B017

AUTHOR: Samson, A. M.

TITLE: Luminescence of Matter With Any Absorption and Emission Bands in Spaces of Finite Dimensions

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 5, pp. 496-501

TEXT: The present article is a reproduction of a lecture delivered at the Eighth Conference on Luminescence (Minsk, October 19-24, 1959). The investigation of resonance luminescence is the first stage in solving the general problem of light propagation in matter with any absorption and emission. In the present paper, the results of the theory of propagation of resonance emission and luminescence in an infinitely thick layer are applied to the case of a finite volume. In this case, the influence exercised by secondary emission and absorption is taken into account by formulas deduced in Refs. 2 and 3. The radiation which - as in the case of resonance - comes from an infinitely thick layer is investigated. It

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depends on the properties of matter and the radiation conditions which, according to Refs. 3 and 6, are characterized by the function $\varphi(x)$, $x = \cos\theta/b(\nu_1)$, where θ is the angle of incidence of external radiation, ν_1 its frequency. $\varphi(x)$ is given by equations (5) - (7), and tabulated on p. 498. $\varphi(\infty) = 1/\sqrt{1-\gamma_0}$, γ_0 denotes the quantum yield. By using this function φ it is possible to study various problems of luminescence of infinitely thick layers under steady-state and nonsteady conditions. As an example, the steady-state problem of spectral dependence of a radiation coming from a medium whose absorption and emission bands have Gauss shape is investigated. The results are illustrated in several diagrams. If the relation between φ and γ_0 is known, intensity calculations can be easily made. Some exact formulas for luminescence intensity with preceding short-period excitation of the system and for medium excitation periods are given, i.e., 1) for the case of excitation of the layer by a diffuse current with the frequency - energy distribution: $I = I_0\varepsilon(\nu_1)/b(\nu_1)$; and 2) for excitation by a slightly absorbed radiation.

In conclusion, the author thanks V. I. Stepanov for having suggested the problem and for his interest. L. M. Biberman is mentioned. There are 1 figure, 1 table, and 10 Soviet references.

ASSOCIATION: Institut fiziki Akademii nauk BSSR (Physics Institute of the Academy of Sciences of the BSSR)

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Card 3/3

S/048/60/024/05/02/009
B006/B017

AUTHORS: Stepanov, B. I., Samson, A. M.

TITLE: Secondary Processes of Absorption and Emission of Light

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 5, pp. 502-508

TEXT: The present article is a reproduction of a lecture delivered at the Eighth Conference on Luminescence (Minsk, October 19-24, 1959). The authors report on the results of their theoretical investigations of resonance luminescence in matter of finite expansion. In contrast to similar investigations of other scientists, they took into account the influence exercised by secondary absorption and emission on the properties of resonance luminescence. The formulas obtained are to be applied to resonance phenomena under various radiation conditions in objects of different sizes. The investigation of the propagation of resonance radiation in finite volumes is the first step in solving the more general problem - propagation of light in matter with any absorption and emission. The influence exercised by secondary processes on the luminescence

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characteristics can be estimated without knowing the structural details of emission and absorption bands. First, the distribution of excited particles within a radiating volume is investigated. The formulas obtained are applied to the special case of an infinitely plane parallel layer which is hit by perpendicularly inciding light. Equations (3) can be solved by graphical integration. Fig. 1 shows the radiation density distribution within the layer (1 cm thick) for six different values of the absorption coefficient k_o. If the density of radiation is known, the total luminescence density and the number of excited particles with any γ (light yield of an elementary volume) can be calculated from equation (4). Fig. 2 shows the density distribution of the excited particles in the layer with different k_o and γ. Already with $\gamma = 0.2$ this distribution differs essentially from that without secondary processes. With $k_o = 0.4$ and $\gamma = 0.2$ the portion of indirectly excited particles is $\sim 10\%$. At higher parameters, it may be 100% and more. In the following, the radiation distribution within and outside this volume is investigated for the

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case of "reflected" light (emitted into the semi-space containing the primary source) and "penetrating" light (emitted into the other semi-space) is investigated. Indicatrices of angular distribution are shown in Fig. 3. In the following, also the nonsteady case is investigated, and formulas for determining the light yield are given. Finally, a semi-infinite layer is studied, and some considerations concerning the diffuse light flux are discussed as well as problems of attenuation. Fig. 4 shows the time dependence of light intensity for different γ (attenuation curves). Their slope is reduced with increasing γ. Finally, also the dependence of the duration of luminescence on the layer thickness is investigated (Fig. 5) both for "reflected" and "penetrating" light. Analyses show that secondary absorption and emission play an even more important part under nonsteady conditions. For calculating the intensities one can confine oneself to first- and second-order processes, whereas processes of higher order must also be taken into account when studying the duration of radiation. There are 5 figures, 1 table, and 4 Soviet references.

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Secondary Processes of Absorption and Emission of Light

S/048/60/024/05/02/009
B006/B017

ASSOCIATION: Institut fiziki Akademii nauk BSSR (Physics Institute of the Academy of Sciences of the BSSR)

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Card 4/4

3.5120

S/169/62/000/004/030/103
D228/D302

AUTHOR: Samson, A. M.

TITLE: Transfer of resonance radiation in a flatly parallel layer

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 4, 1962, 23, abstract 4B153 (V sb. Aktinometriya i atmosfern. optika, L., Gidrometeoizdat, 1961, 241-247)

TEXT: Using the Schwartzwil'd-Schuster approximation, simple expressions were derived for the Ambarzumian functions $\varphi(\xi)$ and $\psi(\xi)$. The approximate values of these functions coincide well with their precise values, obtained by numerically integrating the equations which they satisfy. The approximate formulas obtained for $\varphi(\xi)$ and $\psi(\xi)$ are used to calculate the non-stationary luminescence of a flatly parallel layer. The author calculates the intensities of the reflected and the previous radiation, and also the mean durations of luminescence under different glow-disturbance conditions. [Abstracter's note: Complete translation.]

VB

Card 1/1

S/201/62/000/004/005/005
D234/D308

AUTHOR: Samson, A.M.

TITLE: Taking into account the multiple reflection from the walls of a layer in the theory of transfer

PERIODICAL: Akademiya navuk Byelaruskay SSR. Vestsi. Seriya fizika-tekhnichnykh navuk, no. 4, 1962, 125-127

TEXT: The author considers an infinite, plane-parallel layer of thickness l, assuming that the emission coefficient and the reflection coefficient k depend on the coordinate z only. The intensity of radiation at the point z in the direction θ is

$$I(z,\theta) = \int_0^z \varepsilon(z') e^{-\frac{\tau(z',z)}{\cos\theta}} \frac{dz'}{\cos\theta} + \frac{1}{1 - r^2(\theta) e^{-2\frac{\tau(0,l)}{\cos\theta}}} \times$$

$$\times \left\{ r(\theta) \int_0^l \varepsilon(z') e^{-\frac{\tau(0,z)+\tau(0,z')}{\cos\theta}} \frac{dz'}{\cos\theta} + \right.$$

Card 1/2

Taking into account ...

$$+ r^2(\theta) \int_0^{\ell} \varepsilon(z') e^{-\frac{\tau(z',\ell)+\tau(0,\ell)+\tau(0,z)}{\cos\theta}} \frac{dz'}{\cos\theta} \Bigg\} \qquad (1a)$$

if θ is less than $\pi/2$

$$\tau(z,z') = \int_z^{z'} k(z'')\, dz''$$

Similar formulas are given for θ between $\pi/2$ and π, and for the case of uniformly distributed external radiation. The integral equation of transfer, based on these formulas, is also given. The author thanks V.M. Agranovich for his help. There is 1 figure.

Card 2/2

9.2576 (also 4205)

41823
S/250/62/006/003/002/004
I028/I218

AUTHOR: Samson, A. M.

TITLE: On the conditions of generation in a plane-parallel layer

PERIODICAL: Akademiya Nauk Belaruskay SSR. Doklady. v. 6, no. 3, 1962, 151–154

TEXT: The conditions of radiation generation in an infinite plane-parallel layer of negative absorption coefficient are analysed, and the frequency of the emitted transition is determined. The following conditions of generation are given on the basis of the Maxwell equations:

$$re^{-\frac{4\pi\nu}{c}\chi l} = 1 \tag{1}$$

$$\frac{2\pi\nu}{c} nl - \delta = S\pi \tag{2}$$

where r = the reflection coefficient, ν = the frequency, c = velocity of light, χ = the imaginary part of the refraction index, n = the real part of the refraction index, l = the layer thickness, δ = a phase constant, s = a whole number. It follows that, under some simplifying assumptions, for a system of particles with two energy levels:

$$\frac{2\pi\nu}{c} l - \pi(\nu_0 - \nu)\tau \ln r_0 - \delta_0 = S\pi \tag{15}$$

Card 1/2

where τ = the lifetime of a particle at the upper level in the absence of a field, ν_0 = the maximum absorption line of the particle. A comparison with the corresponding expression for a hollow-space oscillator

$$\frac{2\pi\nu_n}{c} l - \delta_0 = m\pi \tag{14}$$

gives, for $s = m$:

$$\nu = \left(\nu_n - \nu_0 \frac{\tau c \ln \frac{1}{r_0}}{2l}\right) \Big/ \left(1 - \frac{\tau c \ln \frac{1}{r_0}}{2l}\right) \tag{16}$$

It follows from (16) that the genertion condition (2) will be fulfilled at different times for different frequencies, and only in the case $\nu_n = \nu_0$ will the generated frequency be constant, An energetic condition of generation is briefly considered at the end. The English-language references are: A. L. Schawlow and C. H. Townes, Phys. Rev., 112, 1940, 1958; J. Kotik, M. C. Newstein, Journ. Appl., Phys., 32, 178, 1961; R. Karplus, J. Shwinger, Phys. Rev., 73, 1020, 1948.

ASSOCIATION: Institut fiziki AN BSSR (Institute of Physics AS GSSR

PRESENTED: By B. I. Stepanov, Academician)

SUBMITTED: December 19, 1962

S/250/62/006/005/002/007
I024/I224

24,3700

AUTHORS: E. P. Zege, A. M. Samson, and B. I. Stepanov

TITLE: Flare up of proper glow of a plane-parallel layer

PERIODICAL: Akademiya nauk Belaruskay, SSR. Doklady, v. 6, no. 5, 1962, 288–292

TEXT: In contrast to previous works the calculations of the present paper are based on the approximation of non-linear optics. The time-dependence of the radiation density, absorption coefficient and brightness of outgoing fluxes is investigated. By differentiating the expression, given in: Stepanov B. I. DAN BSSR, 5, 41, 1961, for the time-dependence of the radiation density inside a plane-parallel layer, in conditions of multiple reflections, a differential equation is obtained which is equivalent to the differential form of Buger's law. This equation is valid only for times much longer than those needed for light to traverse the thickness of the layer. A relation between the absorption coefficient (assumed throughout this work not to depend explicitly on time) and the radiation density in steady-state conditions is introduced in this equation which is then integrated, yielding an expression relating the initial and steady-state values of the radiation density, the time and a non-linearity factor. This expression is studied in various cases corresponding to stable generation or to attenuation with time. (A necessary condition is that $u^0 \neq 0$). Curves are plotted describing the time behavior of $u/u_{\text{steady-state}}$ for 4 values of $u^0/u_{\text{steady-state}}$ (u is the radiation density and the superscript^0 denotes inital value). An expression is given for the time necessary to reach steady-state conditions

Card 1/2

The minimum value, corresponding to very large $u_{\text{steady-state}}$, is calculated for: reflection coefficient = 0.99, thickness of layer = 10 cm and light velocity = 3.10^{-8} cm/sec and is found to be $2.3.\ 10^{-10}$ sec. Next, the basic equation is improved by including in addition to forced emission also spontaneous emission and other internal energy sources. It is then integrated and the solution investigated in various cases. In contrast to the previous case self-excitation occurs also for $u^0 = 0$ while the transition time to steady-state conditions is of the same order of magnitude as before. There is one figure.

ASSOCIATION: Institut fiziki AN BSSR (Institute of Physics AS BSSR)

SUBMITTED: February 22, 1962

S/051/62/012/002/007/020
E202/E192

24.3500

AUTHORS: Stepanov, B.I., and Samson, A.M.

TITLE: On the theory of absorption and luminescence of complex molecules.
I. The effect of the intramolecular and intermolecular distribution of vibrational energy on the optical properties of molecules

PERIODICAL: Optika i spektroskopiya, v.12, no.2, 1962, 224-232

TEXT: Applying a method of probability to particles with two electron levels, a general theory is developed accounting for the effects of vibrational energy distribution on the optical properties of the complex molecules. Low pressure vapours and solutions are chosen as particular cases. The method accounts automatically for all the equations of kinetic equilibria, which permits determination of the quantum yield of luminescence. It is thus an improvement on the earlier method suggested by B.I. Stepanov (Ref.1: Lyuminestsentsiya slozhnykh molekul (The Luminescence of Complex Molecules), Izd. AN BSSR, Minsk, 1956).

Card 1/2

It is concluded that the anti-Stokes fall in fluorescence has not yet been fully explained, but the analysis of the formulae led the authors to believe that within the scope of the probability method there could be only two possible causes: a) the fall may be due to the presence of non-active absorption, as explained in the previous paper; or b) by assuming that during the excitation of luminescence in the anti-Stokes region its distribution within the molecules is incomplete, resulting in the appearance of the individual degrees of freedom of molecules. The case of solutions or vapours at high pressures is also discussed and the formulae developed are suitable for complex, semi-complex or simple molecules.
There is 1 figure.

SUBMITTED: January 27, 1961

Card 2/2

24.3500

S/051/62/012/002/009/020
E202/E192

AUTHORS: Samson, A.M., and Adzerikho, K.S.

TITLE: Vector-parametric method in the investigation of polarised luminescence

PERIODICAL: Optika i spektroskopiya, v.12, no.2, 1962, 239-247

TEXT: Vector parametric method originally developed by Stokes and capable of simultaneous accounting for all the basic parameters of radiation propagation, e.g. intensity, degree of polarisation, position of plane of polarisation etc., and applicable also to complex phenomena involving secondary absorption and emission processes, was applied to the study of polarisation of the luminescence. As a model of the investigated substance, the authors selected a set of linear oscillators with a random distribution - a condition fully justified by experimentation. The transformation matrix of Stokes parameters was found for the case of interaction of the exciting radiation with the elementary volume of the

Card 1/2

"substance" and hence were developed all the known formulae for the polarisation of the luminescence. The method is rigorous and completely general; it may be particularly useful in studying the effects of multiple absorption and emission processes on the depolarisation of luminescence. There are 2 figures.

SUBMITTED: February 28, 1961

42190
S/051/62/013/004/003/023
E032/E314

24.3500

AUTHOR: Samson, A.M.

TITLE: Quenching of the luminescence of solutions by impurities

PERIODICAL: Optika i spektroskopiya, v. 13, no. 4, 1962, 511 - 517

TEXT: The aim of this work was to generalize existing theories of quenching. It is noted that the problem was also considered by Yu.A. Kurskiy and A.S. Selivanenko (Opt. i spektr., 8, 643, 1960) but was solved differently. The theory is based on the following expression for the probability $\varrho(t)$ of finding a molecule in the excited state at a time t after the beginning of excitation

$$\frac{d\varrho}{dt} = -\left[\frac{1}{\tau_o} + \sum_{i=1}^{N} \int_{V-v} W(\underline{r}_i, \underline{r}'_i; t) f(\underline{r}'_i) dV'_i\right] \varrho(t) \qquad (1),$$

where τ_o is the lifetime of the particle in the excited state

Card 1/4

Quenching of the ....

in the absence of the quencher, $f(\underline{r}')$ is the probability that the energy will be transmitted to a molecule of the quencher at a distance $\underline{r}'$, $W(\underline{r}, \underline{r}'; t)$ is the probability of finding the quenching molecule at $\underline{r}'$ if at a time $t = 0$ it was located at $\underline{r}$, N is the number of quenching molecules in the volume $V-v$ and v is the volume of the excited molecule. A solution of Eq. (1) is then obtained subject to the initial condition $\varrho(0) = 1$ and this solution is then averaged over all the possible initial positions of the quenching molecules. The final result for the average probability of finding a molecule in the excited state at time t, if it was unexcited at $t = 0$, is $\bar{\varrho}(t) = \exp[-t/\tau_o - cH(t)]$, where

$$H(t) = \int_{\infty - v} \left(1 - e^{-\int_{\infty-v} f(r')dV' \int_0^t W(\underline{r},\underline{r}';t')dt'} \right) dV \qquad (6)$$

Card 2/4

Quenching of the ....

where c is the concentration of the quenching particles and the integration is carried out over all space, with the exception of the volume occupied by the excited molecule. As can be seen, if H(t) is known, then the average probability is also known and hence both the yield and the duration of the luminescence can be determined. The form of the function H(t) depends on the form of the function f(r) which, in turn, depends on the nature of the interaction between the quenching and the excited molecules and on the probability W , which is very dependent on the diffusion coefficient (viscosity). These general formulae are then applied to special cases such as the luminescence of gases and quenching in solid solutions. With a suitable choice of the function describing the probability of energy transmission, expressions are obtained both for the resonance and diffusion quenching which hold for solutions of arbitrary viscosity. In the case of diffusion quenching, it is assumed that the quenching occurs only by direct collisions between excited and quenching molecules. The calculation of H(t) is then considerably simplified; the author has in fact been able to bring these calculations to a numerical conclusion which is a reasonable

Quenching of the ....

representation of the experimental results for the quenching of fluorescin by potassium iodide (B.Ya. Sveshnikov et al, Izv. AN SSSR, ser. fiz., 22, 1047, 1958) and other substances. The general formulae reported in this paper may be used to investigate gradual changesin quenching in the transition from resonance quenching to diffusion quenching and vice-versa and the dependence of the luminescence on the viscosity of the solvent It is noted that the diffusion-quenching theory put forward by Sveshnikov et al is not a consequence of the more general considerations reported here and therefore its limits of applicability must be investigated further, even though, at present, it seems to be in agreement with experimental results. There are 3 figures.

SUBMITTED: August 26, 1961

Card 4/4

SAMSON, A.M.

Allowing for multiple reflections from the walls of a layer in transport theory. Vestsi AN BSSR. Ser. fiz.-tekh. nav. no.4:125-127 '62. (MIRA 18:4)

SAMSON, A.M.

Theory of the quenching of luminescence by foreign substances; discussion of B.I.Stepanov's report "Present-day theory of the luminescence of complex molecules". Izv. AN SSSR. Ser. fiz. 26 no.1:41-42 Ja '62. (MIRA 15:2)

1. Institut fiziki AN Belorusskoy SSR.
(Luminescence)

35538
S/020/62/142/006/010/019
B104/B108

AUTHORS: Stepanov, B. I., Academician AS BSSR, and Samson, A. M.

TITLE: Calculation of the generation power of a plane-parallel layer

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 142, no. 6, 1962, 1282-1284

TEXT: The generation power of a plane-parallel layer is studied in approximation of non-linear optics taking into account the dependence of the absorption coefficient k on the radiation density u. Under generation conditions k and u are given by

$$k = \frac{\ln r}{l}; \qquad (4)$$

$$u = \frac{k_0 - k}{\alpha k} = \frac{k_0 l - \ln r}{\alpha \ln r}. \qquad (5),$$

where r is the reflection coefficient at the boundary of the layer; α and k_0 are parameters characterizing the substance of the layer, α always being positive, while k_0 may be positive or negative. The absorption coefficient is negative and completely determined by the resonator properties of the

Card 1/2

layer. A condition necessary for generation is $r \cdot \exp(-k_o l) \geq 1$. The supply of energy within the layer increases with the reflection coefficient. The power of the generated radiant flux per cm^2 depends on the parameter α of nonlinearity and increases with decreasing nonlinearity of the absorption coefficient. The Q-factor of the plane-parallel layer is computed, taking into account non-linear effects. It solely depends on the properties of the bare layer (hollow resonator). When computed without consideration of non-linear effects it depends of the reflection coefficient. There are 1 figure and 5 references: 4 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: G. Stokes, Math. and Phys. Papers, 4, 145 (1904).

ASSOCIATION: Institut fiziki Akademii nauk BSSR (Institute of Physics of the Academy of Sciences BSSR)

SUBMITTED: October 4, 1961

STEPANOV, B.I., akademik; SAMSON, A.M.

Effect of noise on the spectral composition and angular distribution of the emission from a bounded plane-parallel layer. Dokl.AN SSSR 145 no.3:560-563 Jl '62. (MIRA 15:7)

1. Institut fiziki AN BSSR. 2. Akademiya nauk BSSR (for Stepanov).
(Optics, Geometrical) (Radiation)

A.M.
SAMSON, and GRIDKOVSKIY, V. P.

"The effect of charateristics of a substance on the properties of generated radiation."

The report was concerned with properties of an active substance inside the resonator. The pump power, absorption, luminescence, and the power and oscillation threshold of a plane-parallel layer with three energy levels were calculated.

The report presented at the 11th Conference on Luminescence (Molecular luminescence and luminescence analysis) Minsk, 10-15 Sept. 1962.

SAMSON, A. M. and SAVVA, V. A.

"Nonstationary luminescence of an oscillating plane-parallel layer."

Laser luminescence kinetics were discussed.

The report presented at the 11th Conference on Luminescence (Molecular luminescence and luminescence analysis) Minsk, 10-15 Sept. 1962.

STEPANOV, B. I., SAMSON, A. M. and CHEKALINSKAYA, Yu. I.

"The effect of noises on the oscillation of a bounded plane-parallel layer."

The light field inside and outside the resonator in the presence of noises was discussed.

The report presented at the 11th Conference on Luminescence (Molecular luminescence and luminescence analysis) Minsk, 10-15 Sept. 1962.

SAMSON, A.M.; STEPANOV, B.I.

Some problems in the nonlinear theory of the optical properties of plane-parallel layers. Opt. i spektr. 14 no.1:57-64 Ja '63. (MIRA 16:5)

(Optics, Geometical)

STEPANOV, B.I.; SAMSON, A.M.

Calculating the generation power for a system of particles with three energy levels. Opt. i spektr. 14 no.1:65-72 Ja '63.
(MIRA 16:5)

(Optics, Physical) (Probabilities) (Quantum theory)

L 11167-63 EWT(1)/BDS/EEC(b)-2--AFFTC/ASD/SSD--IJP(C)
ACCESSION NR: AP3002787 S/0051/63/014/006/0798/0804

AUTHOR: Adzerikho, K. S.; Samson, A. M.

56
55

TITLE: Effect of secondary absorption and emission processes on the intensity and polarization of luminescence. 1. Solution of the radiative transfer equation for polarized luminescence.

SOURCE: Optika i spektroskopiya, v. 14, no. 6, 1963, 798-804

TOPIC TAGS: radiative transfer, luminescence, polarized luminescence, secondary processes

ABSTRACT: Polarization measurements and effects are highly important in many optical investigations. Accordingly, the authors derive, on the basis of the S. Chandrasekhar (Radiative Transfer, Oxford, 1950) and G. V. Rozenburg, (Dissertation, Moscow University, 1946) radiative transfer equations, precise analytic expressions for the intensity and degree of polarization of the secondary luminescence emerging from a plane-parallel layer of luminescent material of finite thickness under steady-state conditions. Further, they investigate the dependence of the degree of polarization of the luminescence on the frequency and state of polarization of the exciting radiation, the optical depth of the layer, the direction of

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L 11167-63
ACCESSION NR: AP3002787

observation, the absorption coefficient and other factors. The analysis is based on the vector-parametric method (or method of four Stokes parameters) which allows of simultaneous investigation of the intensity and the polarization characteristics of the radiation. Analytic expressions for determining the Stokes parameters in different orders are deduced. "In conclusion, we thank B. I. Stepanov for his interest in the work." Orig. art. has: 20 sets of formulas.

ASSOCIATION: none

SUBMITTED: 10Oct62 DATE ACQD: 15Jul63 ENCL: 00

SUB CODE: 00 NO REF SOV: 017 OTHER: 003

ls/wm
Card 2/2

L 17773-63 EWT(l)/EWG(k)/BDS/ES(w)-2 AFFTC/ASD/ESD-3/IJP(C)/SSD
Pz-4/Pab-4 AT

ACCESSION NR: AP3005846 S/0051/63/015/002/0226/0236

AUTHOR: Adzerikho, K.S.; Samson, A.M.

TITLE: Influence of secondary absorption and emission processes on the intensity and polarization of luminescence. 2. Dependence of the intensity and degree of polarization of the luminescence on the properties of the substance and the direction of observation

SOURCE: Optika i spektroskopiya, v.15, no.2, 1963, 226-236

TOPIC TAGS: luminescence, Stokes parameter, polarization of luminescence

ABSTRACT: In Part 1 of the study (K.S.Adzerikho and A.M.Samson, Optika i spectro., 14,798,1963) there were derived general analytic expressions for the Stokes parameters. These can be used to calculate the dependences of the intensity and polarization of primary and secondary luminescence on the optical parameters of the substance and the conditions of the experiment. In the present paper the authors use these expressions to investigate a number of particular cases that are encountered in practice: observation of the "reflected" and "transmitted" radiation (observation from the illuminated side and from the back), angular distribution of

Card 1/2

STEPANOV, B.I.; GONCHARENKO, A.M.; IVANOV, A.P.; SAMSON, A.M.;
SOTSKIY, B.A.; KHAPALYUK, A.P.

Generation of radiation from an infinite plane-parallel layer.
Izv.AN SSSR.Ser.fiz. 27 no.4:460-465 Ap '63. (MIRA 16:4)
(Masers) (Electric resonators)

SAMSON, A.M.
AID Nr. 997-4 25 June

INFLUENCE OF NOISE ON GENERATION OF A BOUNDED PLANE-PARALLEL LAYER (USSR)

Stepanov, B. I., A. M. Samson, and Yu. I. Chekalinskaya. IN: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 27, no. 4, Apr 1963, 488-491.
S/048/63/027/004/006/026

The effect of noise on the spectral width and angular distribution of radiation generated by a bounded plane-parallel layer has been studied. The noise arises as a result of amplification of external radiation, including spontaneous emission. It is shown that spectral broadening resulting from noise is negligibly small, and that angular distribution changes due to noise depend on the parameters of the layer. In the specific case of a cylinder with plane-parallel ends and nonreflecting side walls, the broadening of the output beam angle because of noise is negligibly small. [BB]

Card 1/1

ACCESSION NR: AP3000310 S/0048/63/027/005/0609/0612

AUTHOR: Samson, A. M.; Savva, V. A.

TITLE: Nonstationary light of a generating plane-parallel layer [Report of the 11th Conference on Luminescence (Molecular Luminescence and Luminescence analysis) held in Minsk from 10 to 15 September 1962]

SOURCE: Izvestiya AN SSSR. Seriya fizicheskaya, v. 27, no. 5, 1963, 609-612

TOPIC TAGS: laser theory, plane-parallel layer emission

ABSTRACT: An analysis has been made of the properties of nonstationary emission of light generated by a plane-parallel layer; the properties depend in a complex manner on pumping power, the cavity, and the working substances. The probability method is used, and calculations are carried out within the framework of geometrical optics. Among the properties considered are pulsation frequency, peak amplitude, and delay time. Two-, three-, and higher-level systems are analyzed. Curves of emission density and other emission characteristics are presented as a function of time for various conditions. Some of the solutions were obtained by using the electronic computer "Minsk-1"

Card 1/2

ACCESSION NR: AP3000310

"In conclusion, we extend deep thanks to V. I. Stepanov for his valuable advice." Orig. art. has: 2 figures and 14 formulas.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 12Jun63 ENCL: 00

SUB CODE: 00 NO REF SOV: 003 OTHER: 000

Card 2/2

SAMSON, A.M.; STEPANOV, B.I., akademik; KHAZOV, L.D.

Generation threshold of an optical maser ad dependent on the properties of the resonator. Dokl. AN SSSR 148 no.2:317-320 Ja '63. (MIRA 16:2)

1. Institut fiziki AN Belorusskoy SSR. 2. AN Belorusskoy SSR (for Stepanov).
(Masers) (Electric resonators)

L 52758-65 EWT(d)/EWT(1)/EEC(k)-2/EWG(v)/FCC/EEC-4/EEC(t) Pn-4/Pe-5/
Pg-4/Pt-7/Pi-4/Pl-4 GS/GW/WS-4
ACCESSION NR: AT5011180 UR/0000/64/000/000/0260/0267

AUTHOR: Adzerikho, K. S.; Samson, A. M.

TITLE: The problem of propagation of polarized radiation in a light-scattering medium with a reflecting bottom

SOURCE: Mezhvedomstvennoye soveshchaniye po aktinometrii i optike atmosfery. 5th, Moscow, 1963. Aktinometriya i optika atmosfery (Actinometry and atmospheric optics); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1964, 260-267

TOPIC TAGS: atmospheric optics, polarized radiation, radiation propagation, molecular scattering, scattering medium, light reflection

ABSTRACT: Investigations of the propagation of radiation in a medium with a reflecting bottom have been made by a number of authors. However, solutions of the radiation transfer equation for molecular scattering have been obtained without taking into account the state of polarization; besides, they are quite complex and difficult to analyze. In this paper, the authors have determined the intensity and polarization characteristics (maximum degree of polarization, position of the plane of predominant polarization, degree of ellipticity) for first-order molecular scattering when the medium has a reflecting bottom. Numerical compu-

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L 52758-65

ACCESSION NR: AT5011180

tations of these values are made for a constant reflection coefficient and for a case when it is dependent on the angle of incidence of radiation. The authors have also determined the angular distribution of the intensity and degree of polarization of outgoing radiation as a function of the reflectivity of the underlying surface, the optical properties of the investigated medium and the angle of incidence of external radiation. It is assumed that the investigated medium has an optical thickness τ_0 and is bounded by a reflecting surface at the bottom ($z = z_0$). Two cases are considered: 1) the reflection coefficient is not dependent on the angle of incidence and is determined entirely by the properties of the underlying medium, and 2) the underlying medium reflects radiation in conformity to the Fresnel laws. The results are shown in Figures 1-4 of the Enclosure. Orig. art. has: 14 formulas, 4 figures and 1 table.

ASSOCIATION: Institut fiziki AN BSSR, Minsk (Physics Institute, AN BSSR)

SUBMITTED: 25Nov64 ENCL: 05 SUB CODE: ES, OP

NO REF SOV: 008 OTHER: 000

Card 2/2

L 17693-65 EWG(j)/EWA(k)/FBD/EWT(1)/EWP(e)/EWT(m)/EEC(k)-2/EEC(t)/T/EEC(b)-2/EWP(k)/EWA(m)-2/EWA(h) Pf-4/P1-4/P1-4/Pn-4/Po-4/Peb ASD(a)-5/AFMD(t)/AFETR/RAEM(a)/RAEM(e)/RAEM(c)/ESD(gs)/ESD(t)/IJP(c) WH/WG

ACCESSION NR: AP4049223 S/0201/64/000/003/0129/0131

AUTHOR: Samson, A. M.

TITLE: Accumulation and consumption of radiation in a layer with separable mirrors

SOURCE: AN BSSR. Izvestiya. Seriya fiziko-tekhnicheskikh nauk, no. 3, 1964, 129-131

TOPIC TAGS: laser optics, laser radiation, ruby laser, laser energy

ABSTRACT: The case when the reflecting cavity mirrors of a laser are not directly deposited on the active medium, but are located some distance away from it, is analyzed. It is shown that in the case of separated mirrors the radiation density in the medium is given by a formula of the form

$$u = u_0(x)[1 - e^{-\alpha t}],$$

Card 1/2

L 17693-65
ACCESSION NR: AP 4049223

and when the distance between mirrors increases the exponent α increases, i.e., the radiation accumulation in the medium slows down. The results are compared with those obtained without spaces between the mirrors and the medium. It is shown that in the case of a ruby laser an increase in the distance between the mirrors decreases the frequency of the radiation-density pulsations but does not change the transient time. Orig. art. has: 1 figure and 10 formulas.

ASSOCIATION: None

SUBMITTED: 00 ENCL: 00

SUB CODE: EC, OP NR REF SOV: 003 OTHER: 000

Card 2/2

L 25315-65 EWT(1) IJP(c)

ACCESSION NR: AP5003321 S/0201/64/000/004/0023/0029

22
B

AUTHOR: Adzyarykha, K. S.; Samson, A. M.

TITLE: Contribution to the investigation of polarized luminescence of crystals

SOURCE: AN BSSR. Izvestiya. Seriya fiziko-tekhnicheskikh nauk, no. 4, 1964, 23-29

TOPIC TAGS: luminescence, polarization, Stokes parameter, luminescence center, luminescence intensity, cubic crystal

ABSTRACT: The vector-parametric method (method of four Stokes parameters), described by G. V. Rozenberg (UFN v. 56, 77, 1955 and v. 69, 57, 1959), is proposed for the study of the polarized luminescence of crystals. A transformation matrix is derived for the Stokes parameters for the crystal luminescence centers. With the aid of this matrix it is possible to obtain the most general relations for the intensity and principal polarization characteristics of luminescence of crystals of arbitrary syngony. Concrete calculations of the characteristics are made for cubic crystals. "The authors thank Professor B. I. Stsyapanaw for remarks."

Card 1/2

L 25315-65

ACCESSION NR: AP5003321

Orig. art. has: 1 figure, 27 formulas, and 1 table.

ASSOCIATION: None

SUBMITTED: 00 ENCL: 00 SUB CODE: OP, SS

NR REF SOV: 007 OTHER: 000

Card 2/2

ACCESSION NR: AP4011504 S/0051/64/016/001/0167/0169

AUTHOR: Stepanov, B.I.; Samson, A.M.

TITLE: Rate of attainment of stable oscillation of lasers

SOURCE: Optika i spektroskopiya, v.16, no.1, 1964, 167-169

TOPIC TAGS: settling time, laser, laser oscillation, laser stability, laser modes, radiation density

ABSTRACT: The paper presents a brief mathematical analysis of the rate of attainment of stable operation of lasers. The initial equation characterizing the variation of radiation density with time for a given mode is taken from earlier work by the authors (E.P.Zege, A.M.Samson and B.I.Stepanov, DAN BSSR,6,288,1962). The absorption coefficient is assumed to depend only on the frequency. Both useful loss (emission) and harmful losses are taken into account. The settling times for different modes and conditions of emission are evaluated; they are of the order of 10^{-4} sec. The stable density versus time function is, as a rule, characterized by narrow peaks ($\Delta t < 10^{-6}$ sec). Orig.art.has: 12 formulas.

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ACC.NR: AP4011504

ASSOCIATION: none

SUBMITTED: 20May63 DATE ACQ: 14Feb64 ENCL: 00

SUB CODE: PH NR REF SOV: 005 OTHER: 000

Card 2/2

SAMSON, A.M.

Reply to V.I.Shirokov and A.S.Selivanenko. Opt. i spektr. 16 no. 4:697-699 Ap '64. (MIRA 17:5)

ACCESSION NR: AP4035478 S/0051/64/016/005/0869/0880

AUTHOR: Samson, A. M.

TITLE: Nonstationary luminescence of a three-level laser. I. Basic equations and their approximate analysis

SOURCE: Optika i spektroskopiya, v. 16, no. 5, 1964, 869-880

TOPIC TAGS: three level laser, laser luminescence, nonstationary luminescence, ruby laser, high quality resonator, laser theory

ABSTRACT: The nonstationary luminescence of a three-level laser has been studied under experimental conditions as a function of its properties. The basic equations were formulated using the probability and geometrical optics methods. It has been shown that in the case of a ruby laser the number of initial equations can be reduced. The luninescence properties of a three-level laser were analyzed by means of linearization of its equations. The conditions for existence of the laser pulsation were established, and it was shown that in high-quality resonators the steady-state regime is established without pulsations. Formulas for the pulsation frequency, the

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frequency shift in the density oscillation of emission and luminescence, were derived and used to show the relationship between the above mentioned parameters and the loss coefficients, and the pumping power. Orig. art. has: 43 formulas and 6 figures.

ASSOCIATION: None

SUBMITTED: 20May63 DATE ACQ: 22May64 ENCL: 00

SUB CODE: PH NO REF SOV: 006 OTHER: 009

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ACCESSION NR: AP4039708 S/0051/64/016/006/1045/1053

AUTHOR: Samson, A. M.; Savva, V. A.

TITLE: Nonstationary luminescence of a three-level laser

SOURCE: Optika i spektroskopiya, v. 16, no. 6, 1964, 1045-1053

TOPIC TAGS: three level laser, laser luminescence, nonstationary luminescence, computer application

ABSTRACT: A numerical solution of a system of equations for a three-level laser is computed as a single-mode approximation on the Minsk-1 digital computer. Laser behavior is studied in the case of large deviations from the stationary state. The radiation density and the initial absorption coefficients are shown as functions of time for various resonator losses and pumping powers. The use of the computer made it possible to investigate populations on the levels and, consequently, luminescence as functions of time. The laser excitation time is evaluated and the emission properties are

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ACCESSION NR: AP4039708

investigated in the case of instantaneous switching of an interferometer. The analysis of computer solutions indicates that the basic characteristics of nonstationary luminescence (excitation time, pulsation frequency, length of transition period, et cetera) are functions of material properties, resonator, and pumping power. It is shown that the pulsed generation and luminescence exist and attenuate normally. The luminescence power in the 2↔1 and 3↔1 levels also pulsates with time, but these pulsations do not coincide in phase with the luminescence intensity pulsations. This further indicates the existence of generation in the nonstationary state. The authors thank B. I. Stepanov for his continuous attention and valuable remarks. Orig. art. has: 12 formulas and 6 figures.

ASSOCIATION: none

SUBMITTED: 20May63 DATE ACQ: 24Jun64 ENCL: 00

SUB CODE: EC, DP NO REF SOV: 002 OTHER: 000

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APANASEVICH, P.A.; BORISEVICH, N.A. VOLOD'KO, L.V.; GLADCHENKO, L.F.; GRIBKOVSKIY, V.P.; GURINOVICH, G.P.; IVANOV, A.P.; KUZNETSOVA, V.V.; PIKULIK, L.G.; PILIPOVICH, V.A.; RUBANOV, A.S.; RUBANOV, V.S.; SAMSON, A.M.; SARZHEVSKIY, A.M.; SOLOV'YEV, K.N.; UMREYKO, D.S.; KHAPALYUK, A.P.; YEL'YASHEVICH, M.A., akademik, red.

[Interaction between nonequilibrium radiation and matter] Vzaimodeistvie neravnovesnogo izlucheniia s veshchestvom. Minsk, Nauka i tekhnika, 1965. 223 p. (MIRA 18:3)

1. Akademiya nauk SSSR. Institut fiziki. Akademiya nauk Belorusskoy SSR (for Yel'yashevich).

EWA(k)/EWP(e)/EWT(l)/EEC(k)-2/T/EEC(t)/EWP(k)/EEC(b)-2/EWA(m)-2/

AUTHOR: Samson, A. M.; Savva, V. A.

TITLE: Analysis of a single-pulse laser with instantaneous Q-switching

SOURCE: AN BSSR. Doklady, v. 9, no. 1, 1965, 22-26

TOPIC TAGS: laser theory, single pulse laser, pulsed laser, Q switching, Q spoiling, instantaneous Q switching

ABSTRACT: This article is a continuation of two previous works by the authors (Izv. AN SSSR, 27, 609, 1963 and Optika i spektroskopiya, 16, 1045, 1964). Formulas are presented for analyzing the basic characteristics of a single-pulse Q-switching laser as functions of population inversion, pumping power, mirror reflectivity, and other properties of the active medium and resonator. A comparison of these [illegible] computations made on a digital computer attests to the effectiveness of the former for use in actual cases, e.g., for the case of laser action during instantaneous Q-switching. An analysis of pulsed laser emission with noninstantaneous Q-switching will be discussed in a subsequent paper. Orig. art. has 17 formulas, 2 figures, and 1 table. [Yk]

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ACCESSION NR: AP5006863

ASSOCIATION: Institut fiziki AN BSSR (Physics Institute, AN BSSR)

SUBMITTED: 27Nov64	ENCL: 00	SUB CODE: EC
NO REF SOV: 006	OTHER: 002	ATD PRESS: 3200

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L 43194-65 EEC(b)-2/EWG(r)/EEC(k)-2/EWA(h)/EWA(k)/EWP(k)/EWT(l)/EWT(m)/
EEC(t)/FBD/EWP(i)/T/EWA(m)-2/EWP(e) Pf-4/Pi-4/Pl-4/Pm-4/Pn-4/Po-4/Peb
ACCESSION NR: AP5010043 IJP(c) WH/WG UR/0368/65/002/002/0142/0146

AUTHOR: Gintoft, R. I.; Samson, A. M.; Sarzhevskiy, A. M.

TITLE: Determination of certain ruby laser characteristics in the nonstationary generation mode

SOURCE: Zhurnal prikladnoy spektroskopii, v. 2, no. 2, 1965, 142-146

TOPIC TAGS: ruby laser, nonstationary laser operation, pump power dependence, laser pulsation, laser

ABSTRACT: The authors measured the pump waveform, the time of appearance of the first oscillation spike, and the average period of the random laser power pulsations of a 6.5-cm ruby laser with end surfaces having ~90% reflection, and established the dependence of the time of appearance of generation and of the pulsation frequency on the pump power. The results were compared with theoretical calculations of the average pulsation power based on the determination of the absolute probability of pump-quantum absorption, developed in earlier papers of one of the authors (Samson, Opt. i spektr. v. 16, 869, 1964, and others). The experimental

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ACCESSION NR: AP5010043

results have confirmed the validity of the theory, which is shown to apply also to irregular pulsations. The minimum energy introduced into the active medium is estimated. It is pointed out that the results can yield, in principle, new data on the characteristics of the working medium in the lasing mode by measuring the nonstationary behavior of the laser as the interferometer base is varied. Orig. art. has: 3 figures, 6 formulas, and 1 table. [02]

ASSOCIATION: none

SUBMITTED: 10Sep64 ENCL: 00 SUB CODE: EC

NO REF SOV: 005 OTHER: 003 ATD PRESS: 3242

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